BEST PRACTICES GUIDE

ENERGY CONSERVATION PLAN FOR UNIVERSITIES, STATE AGENCIES AND SCHOOL DISTRICTS IN SOUTH CAROLINA

Developed by
South Carolina Energy Office
of the South Carolina Budget and Control Board

1201 Main Street, Suite 430
Columbia, SC 29201

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Background

The South Carolina Energy Conservation and Efficiency Act of 1992, Article 6, Section 48-52-620(A), requires each state agency and public school district to submit for approval to the South Carolina Energy Office (SCEO) an energy conservation plan and energy conservation goals, including energy consumption goals. The SCEO is also required to provide suggested formats for plans and goals that must be submitted and all technical assistance necessary for state agencies and school districts to satisfy the requirements of the legislation.

This guide is designed to provide the facility directors of each agency or district with the useful methods of reducing the consumption and cost of energy while satisfying the law.

Best Practices Guide

CONTENTS

Energy Management, Managers and Planning

Any effective program requires a manager, someone responsible for the establishment and satisfaction of its goals. Very few institutions in South Carolina expend sufficient funds to justify a full-time, dedicated energy manager. Some might. Generally, the job would be filled by an Energy Manager with other collateral duties, or a Different Position with collateral duty as Energy Manager. *In any event, a sufficient portion of that person's job performance rating should be predicated on the achievement of energy goals and reduction of energy cost expense.* ***The increased utility cost should more than justify this!***

Establishment of an energy plan can be simplified to Navigational Determination: determine **where you are**; determine **where you need to go**; and determine **how to get there.**

Where you are is the least complicated. It is the amount and cost of energy for your baseline year – often the most recent completed year.

Where you need to go is only slightly more complicated. It can be a percentage reduction in amount of energy, as measured in kilowatt-hours of electricity, therms of natural gas, gallons of fuel oil or *in the actual costs* of these media. The amount of the percentage can be large (15-20%) if nothing has been done, or lower (7-12%) if measures are currently in place to conserve. It can also be a unit (square foot) level of energy or cost for each type of building or total complex. Complications to these values arise in the measurement of demand charges for electricity and in the escalating costs of all energy, as witness natural gas increases in 2005. Changes in the physical plants will also complicate the final numbers.

How to get there is the most technical and difficult of the factors. Often, as a start, only someone familiar with the buildings needs to pay attention to the detail of turning equipment off and in the basic efficiency of products used.

Two rules that apply to public building energy savings are: (1) If equipment does not need to be operating all the time, keep it off as long as possible and (2) If equipment does need to be operating all the time, make it as efficient as possible. Refinements to these rules will naturally follow.

The checklists for operating and maintenance and for energy conservation measures included with this guide can be used for many applications. For larger facilities and those with more complex equipment, energy consultants can be hired to provide conservation measures with relative costs and savings paybacks. The Energy Office can assist with lists of consultants and financial assistance programs to implement the measures.

Much of the success in energy plans is determined by the concentrated effort to establish what needs to be done, to do it and to provide continuing attention to the tasks required to save.

Establishment of a money saving energy conservation program is similar to the establishment of a religion. With faith comes conversion to the program and then regular observance of its rituals. And, from time to time, a good old fashioned revival is required to get back on track.

Establishing an Energy Plan

Facility Data Collecting

Apparently simple, but often overlooked or incorrect, is the conditioned area (in square feet) of the buildings. Correct measurements of the gross area (outside dimensions) of the buildings are vital to comparison with similar data across the state and with goal setting.

Establishment of an energy baseline can be done by examination of the invoices. Utility companies, if requested, present monthly summaries of use of customers' electricity, natural gas, fuel oil and water/sewer. These summaries are sometimes not as conveniently differentiated by building as might be desired, but energy use by type can be determined. For thirteen years this information of energy use in South Carolina public facilities has been required by the SCEO.

Until recently (2005) utility rates have been relatively stable, but due to international events and weather disasters, they have become increasingly variable. Nonetheless, a baseline is necessary and, while a KWH or therm (or combined as a BTU/square foot) baseline would be the most accurate, it would also be the least understood. Money is universally spoken and we suggest that the primary baseline be established as the highest cost per square foot of the last three years, providing no major anomaly has caused a spike.

Thus the baseline is the dollars per square foot for each major building of a college campus, state agency, or the campus of each school (kindergarten through 12^{th} grade).

While the baseline and goal are in dollars, a monthly comparison of KWH and therms is necessary for following the program's progress.

Determining Goals

Comparison by the agency or district of its relative cost per square foot against similar facilities in the state can be drawn from the Annual SCEO Energy Report. A realistic goal can be obtained by observing what has been achieved by others, considering some factors.

Among these factors is what the leaders in efficiency have accomplished and how long they have achieved their high levels of success. Do they deal in the same functions and

hours as you? Are the leaders dealing with primarily new buildings that have been designed with efficiency emphasized? Do they have people designated and operating as energy managers? Are they in areas of very low utility rates? Perhaps their current levels are beyond your reach. Modify upwards.

Has your facility already invested in efficiency programs such as lighting retrofits, HVAC renovations, energy management system installations or people-intensive awareness initiatives? Congratulate yourself but understand that savings potential is less; if a facility has incorporated energy savings measures, there will be less opportunity for savings.

Is your facility at a point where maintenance requires extensive replacement of aging machinery that can be replaced with more efficient units? Could equipment replacement be a component in reducing energy costs? Factor this in.

Has the district or campus expanded to the point where an additional member of the facilities staff is required? Can they be brought in with the skills to also emphasize on energy cost reduction? Bringing in is a major opportunity to justify a position and largely pay for it. Set the sights on greater savings.

Reports and Reporting

If not tracked monthly, energy use will be unmanageable. Fortunately, electricity, natural gas, and water are totaled monthly, billed, and delivered in a timely fashion. Fuel oil is less regularly totaled, but still workable.

Establishment of the energy baseline requires the listing by building, by month, the amount of kilowatt-hours (KWH), therms and hundred cubic feet of water for each building, or each meter.

Timely recording of current billing data compared against the baseline and intervening years will provide as-current-as-possible information to act upon and correct, if necessary. Investigation of a substantial jump in consumption that is not explained by unusual weather or special events can lead to discovery of a fault in the program control system or an underground break in a water line.

Parallel comparison of the cost of these utilities does not need to be as detailed but will allow score to be kept in the terms that make the realities of the program worthwhile. Annual cost totals provide a measure, year by year, of the budget effectiveness of the effort.

METHODS OF ENERGY CONSERVATION

Construction

When building new or adding/renovating, maintain the position with the architect and his mechanical and electrical consultants that energy conservation is a vital factor in the design of new buildings or additions to existing facilities. **Glass areas, ceiling height and wall insulation** are architectural features that can be made efficient and still visually appealing. **Heating and air conditioning systems** can be energy efficient, properly zoned, closely controlled and easy to maintain. These features may not normally be the designer's approach, but they must be emphasized by the owner. **Lighting** can be attractive and illuminating with an adherence to relatively low wattage per square foot. Economy of lighting must be tempered with a sound grasp of security, as vandalism or injury can immediately erase any benefits of low power bills.

Life cycle costing is recommended by many as a method of determining the total worth of a particular item over a period of time. ***This should be required!!*** The complication of totaling first cost, unit operating cost, total operating time and differences of maintenance costs are compounded when the predictions of inflation and interest rates over the next ten years are input. Computer programs can provide very precise answers of sometimes questionable accuracy. Extreme simplification is recommended. ***Temperature standards should be set. (For example, cooling at 78 degrees, heating at 68 degrees.)***

Equipment

The first "equipment" to come to mind in this context is Heating, Ventilating and Air Conditioning (HVAC) machinery as specified by a mechanical engineer. The engineer's considerations in selection deal with cost, location, maintenance, size, capacity, energy efficiency and owner preference. Generally, this consultant is at the location and space mercy of the architect. The engineer's personal preference may vary between central systems (chiller and boiler plants with piping distribution systems), unit ventilators, rooftop units, wall mounts or many others. Natural gas may or may not take preference over heat pumps. The owner should be prepared to discuss the options with the designer and assist in the selection of types of systems that the owner and the maintenance personnel will live with for years.

Plumbing considerations include the possibility of wells for irrigation and automatic flushing and faucet sensors.

The electrical engineer is responsible for the design of the power distribution within the building, emergency generation (if desired or required), power to the operating equipment and lighting. Generally, lighting is the greatest variable that drives optional energy use under this discipline. This consultant has the opportunity to vary light levels in differing areas (within the appropriate state guidelines), to provide task lighting or area lighting, and to provide switching to allow light levels to be adjusted down when areas

are not in use. Sensors to automatically reduce artificial light in response to natural lighting are also available. These options should be discussed and compared.

Program Control

"Automatic (or Smart) Buildings," a catchphrase popular a few years ago, is now a common reality, although in varying applications. From the venerable "on-off" time clock to remotely controlled temperature, humidity, light, security and automatic reporting systems, almost any degree of control is possible, if affordable.

In an organization with a central operations or maintenance facility and multiple buildings, especially in differing locations, the central control oversight of buildings is highly affordable and worthwhile. The control systems commonly installed in any building of commercial size are stand-alone microprocessors capable of independent and flexible programming. The additional value of central change capability and regular interrogation from the central office is beneficial. For your purposes, program control of lighting and equipment operation, monitoring/setting of space temperatures and changing of schedules should now be considered a minimum capability. With this capability, however, is the need for the talent and desire to properly utilize the equipment. The automatic controls must have supervision.

Behavior Modification

In a learning and working environment, basic comfort is the reason for lighting, heating and cooling systems. The denial of basic comfort during the normal hours of work is a guaranteed conflict and generally counterproductive. Two dozen people in a single space cannot agree on the proper temperature for complete comfort, but within limits, compromise is possible. It is a more important issue to agree upon acceptable temperature and lighting levels during periods of *less than total occupancy*.

In a school setting, it is important to determine if the clients are the students or the staff. Should the immediate savings begin with reduced comfort upon the departure of the students, or with after the later occupancy of the staff? What is the degree of temperature range – and in what locations – for the custodial staff? Timed override switches, available for preset extension of comfort conditioning or lighting can be provided, at a price, for certain local areas within the building. Scheduled conditioning/lighting of areas can also be pre-programmed for regular custodial work.

Maintenance (*This needs to be stressed, required and audited.)*

If not in the same agency, maintenance should be a natural ally of energy conservation. Filter changes, lubrication, cleaning and repair contribute to the more efficient use of powered equipment. Organized, programmed maintenance, with records of the installation and regular servicing of the equipment, will help set the budget for scheduled replacement with more efficient machinery. Coordination is essential. Even replacement

of light bulbs with the most energy efficient bulb type is not guaranteed if a cheaper first cost is borne from a budget other than the energy accounts.

Managing

After the program is established, it cannot be ignored or the savings will diminish or completely disappear. The first necessary requirement is to record and compare energy use on a monthly basis against the baseline and any prior history. Following this practice might seem like you are a month behind, but it is as close as you can reasonably be expected to examine. Spikes in usage should immediately be investigated, usually in person, or by asking the occupants. Weather can also be a factor.

Regular investigation, by computer, of the schedules of the buildings and zones will keep the manager apprised of the actual operation of the equipment. Surprises can be discovered and avoided.

Occasional after-hour visitation to look for lights and listen for conditioning will confirm that the computer's view of operation is real. Sensors drift and relays fail.

Regular reports to the occupants, "the clients," will pay off, especially if they are asked to participate in the program. Their participation can be valuable, especially if they report after-hours unwarranted operation of conditioning. Interaction with the clients to assure their comfort and your economy is a key role of management. In addition to monthly usage data to each manager, principal, etc, an annual presentation of performance results can be a motivational tool for further cooperation.

PROGRAM ASSISTANCE

Technical

The level of direct technical assistance from the SCEO varies with available funding. Limited energy audits from the Energy Office are available and SCEO can provide lists of consultants who can provide energy evaluations and the foundations for energy plans for clients.

The Energy Office will also provide information on the Energy Star Program, a federal approach which provides guidelines and reference to endorsed energy saving products.

Financial

A self-funding investment program with a payback from savings is the most desirable situation, but requires an initial investment.

A low interest energy loan program is available through the SCEO for qualifying entities.

Performance contracting, a form of commercial lending based upon energy consumption in buildings, is available through several local and national vendors. It is useful in the financing of large mechanical/electrical projects when conventional means are not feasible.

(SAMPLE)

ENERGY PLAN FOR SCHOOL DISTRICTS OF SOUTH CAROLINA

Developed by

South Carolina Energy Office
of South Carolina Budget and Control Board

March 2006

Sample Energy Plan for School Districts in South Carolina

CONTENTS

PURPOSE

In keeping with the national goals of energy independence and with the obligations to the citizens of this district to efficiently apply public funds, this plan is intended to maintain conditions of comfort and security for the students and staff at the minimum use of energy and utility cost.

POLICY

This district shall attempt to eliminate the unnecessary use of purchased energy and to economize the remainder to the greatest extent possible.

With the concurrence of administration and staff, space conditioning times will be minimized without affecting instruction or regular activities.

Lighting will be minimized without detriment to instruction, safety or security.

Equipment improvements and replacement for better efficiency will be included in the budget and implemented as funding allows.

The primary person responsible for this program shall be the Energy Manager, reporting ultimately to the senior administrator for business and will closely coordinate with each school principal.

ENERGY MANAGER

The administration will designate an Energy Manager, either as a primary or collateral duty. **(*May want to define duties/ background more to avoid the "Good old boy" system.)*** This person shall be responsible for implementing and continuing the energy plan. The performance evaluation of this person will include the progress of energy savings. The Energy Manager will bear the responsibility for providing the measures for reducing energy consumption, assisting in their implementation, following the monthly comparison of consumption and providing periodic reports of progress to administration and end users of energy. *(It is best if the energy manager is knowledgeable in the mechanical systems in the facilities. A good working relationship with the principals and custodial staffs is necessary.)*

FACILITY DATA

Establish by school, major building of each school, district office and any major support building, the actual heated area in gross square feet. (*Gross square feet includes the outside wall dimension of each building. Often the insurance information for the district includes this number.)*

Evaluate the electrical and natural gas metering to the facilities and assign the correct metering information to each building. Using one of the programs available

commercially, build a spreadsheet of monthly use in KWH and Therms for each facility. Add in the irregular delivery of fuel oil, if applicable, for the annual total. Establish a baseline of use and of cost. (*This can be done by using the last year's use or an average of the last three years, providing the building usage has not changed. The cost baseline is best used from the latest year or perhaps from the highest of the last three years.)*

Divide the annual cost of all energy sources by the gross square feet. This is a comparison benchmark within your own district and across the state. *(In districts with a long term energy program, habits, conservation measures, attention to detail and deliberate building strategies have contributed to low area cost.)*

List types of HVAC equipment and major systems in each school. Note types of lighting. *(This is a good time to update any equipment listings to include manufacturer, model number and age of major equipment for maintenance purposes. The wattages and models of lighting should be noted and a watt per square foot in classrooms, offices and corridors should be recorded.)*

GOALS

Establish a five year plan for energy reduction in existing buildings. Assume measurable reduction at the end of the first year AFTER the initial implementation. *(If no appreciable energy measures have been made to date, derive a 15% cost reduction over the five year period. Assume 7% of that will be achieved in the first twelve month period after initial measures are taken. The next goals will be 2% per year for four years. Actual energy use will have to be reduced more than these percentages to counter fuel cost increases.*

If major measures have already been implemented, establish goals of 2% per year for five years.

If the total of facilities is extensive and/or the equipment is complicated, the use of a consultant to evaluate the opportunities for energy saving might be required. The resultant report should include proposed measures, their costs and estimated savings. The final energy plan should determine the amount to be invested in savings projects each year and the total savings to be realized. Goals should be established as reasonable and achievable and must be agreed upon by administration.)

GOAL ACHIEVEMENT

Operations and Maintenance (*T**his needs to be stressed, required and audited.)***

In a district that has not had a definitive conservation program, or has let its program lapse, the greatest savings would be found in operation of the conditioning and lighting systems. Reduction in run time, either through changes in the operating schedule of an

existing energy management system (EMS), repair of the EMS or improved manual operation of equipment (especially lights) will produce the most immediate reduction.

Changeout of lighting from incandescent or standard 40 watt fluorescent tubes to the 32 or 34 watt types, can be an immediate low budget move. ***Suggest T-8s with electronic ballasts, LED Exit lights, LEDs in MCCs, etc.***

Investigate the list (Appendix A) for measures.

Projects for Conservation

Appendix B contains a comprehensive list of projects. The district should decide where the need is greatest and what the budget will allow. *(Often the lighting project, or relamping, could fall from the operations category into projects, depending on the scope. Installation of an EMS or enhancement of an existing system would produce immediate results, if done and used correctly. If old or maintenance-intensive HVAC equipment could be replaced with more efficient models, this is a good dual opportunity.)*

Major projects would include the replacement of major systems, roof insulation and repair, or the reduction of window area in older classrooms. *(Identification of these opportunities, their estimated costs and projected paybacks may require outside consulting expertise.)*

New Construction

A school district should provide input to design teams with emphasis on energy efficiency. Develop district guidelines for lighting levels within those provided by the S.C. Department of Education. Establish a reasonable standard for efficient HVAC systems. Insist on reasonable and compatible control systems with logical zoning, especially in additions and renovations. ***All too often our input for this is ignored or sacrificed for cosmetics.***

INVOLVEMENT

Administration

The most effective programs have support from the highest levels of administration. Once the policy is established that the end user is a) students, b) faculty or c) custodial (in descending order of savings), the Energy Manager should expect the backing of the administration to enforce the operation of the energy consuming equipment.

Staff

The cooperation of the faculty and staff of each school can be invaluable to the information flow and efficiency of the program. If the energy program is perceived as friendly to the inhabitants and all reasonable efforts are made for their comfort, this

cooperation can be achieved. *(On occasion, a payback of energy savings in the form of non-designated funds to the school can serve as a tangible reward.)*

Reporting

The Energy Manager will monthly enter the current usage of metered energy into the spreadsheet for comparison against previous years, with a running total for the current school year to date. Appropriate copies should be distributed as soon as possible to each school's principal (as end user) and all reports forwarded to the district Facility Director and Chief Business Officer as designated.

As closely as possible to the end of the school year, a report will be distributed to all concerned, including the school board. *(Depending on the circumstances, awards may be distributed, ranging from certificates to tangible, for exceptional performance.)*

Appendix A

Operating and Maintenance

Suggested Measures

Appendix B

Suggested Projects for Conservation

(SAMPLE)

ENERGY PLAN FOR COLLEGES AND UNIVERSITIES OF SOUTH CAROLINA

Developed by

South Carolina Energy Office
of South Carolina Budget and Control Board

Developed March 2006

Sample Energy Plan for Colleges and Universities in South Carolina

CONTENTS

Purpose

In keeping with the national goals of energy independence and with the obligations to the citizens of this institution to efficiently apply public funds, this plan is intended to maintain conditions of comfort and security for the students and staff at the minimum use of energy and utility funding.

Policy

This institution shall attempt to eliminate the unnecessary use of purchased energy and to economize the remainder to the greatest extent possible.

With the concurrence of administration and staff, space conditioning times will be minimized without affecting instruction or regular activities.

Lighting will be minimized without detriment to instruction, safety or security.

Equipment improvements and replacement for better efficiency will be included in the budget and implemented as funding allows.

The primary person responsible for this program shall be the Energy Manager, reporting to the Director of Facilities.

Energy Manager

The administration will designate an Energy Manager, either as a primary or collateral duty. ***(May want to define duties/ background more to avoid the "Good old boy" system.)*** This person shall be responsible for implementing and continuing the energy plan. The performance evaluation of this person will include the progress of energy savings. The Energy Manager will bear the responsibility for providing the measures for reducing energy consumption, assisting in their implementation, following the monthly comparison of consumption and providing periodic reports of progress to administration and end users of energy. *(It is best if the energy manager is knowledgeable in the mechanical systems in the facilities. A good working relationship with physical plant operators and custodial staffs is necessary.)*

Facility Data

Establish by each major building, the actual heated area in gross square feet. (*Gross square feet includes the outside wall dimension of each building. Often the insurance information includes this number, but comparison against the plans is recommended.)*

Evaluate the electrical and natural gas metering to the facilities and assign the correct metering information to each building. Using one of the programs available commercially, build a spreadsheet of monthly use in KWH and Therms for each facility. Add in the irregular delivery of fuel oil, if applicable, for the annual total. Establish a

baseline of use and of cost. (*This can be done by using the last year's use or an average of the last three years, providing the building usage has not changed. The cost baseline is best used from the latest year or perhaps from the highest of the last three years.)*

Divide the annual cost of all energy sources by the gross square feet. This is a comparison benchmark within your own facility and across the state. *(In schools with a long term energy program, habits, conservation measures, attention to detail and deliberate building strategies have contributed to low area cost.)*

List types of HVAC equipment and major systems in each school. Note types of lighting. *(This is a good time to update any equipment listings to include manufacturer, model number and age of major equipment for maintenance purposes. The wattages and models of lighting should be noted and a watt per square foot in classrooms, offices and corridors should be recorded.)*

Goals

Establish a five year plan for energy reduction in existing buildings. Assume measurable reduction at the end of the first year AFTER the initial implementation. *(If no appreciable energy measures have been made to date, derive a 15% cost reduction over the five year period. Assume 7% of that will be achieved in the first twelve month period after initial measures are taken. The next goals will be 2% per year for four years. Actual energy use will have to be reduced more than these percentages to counter fuel cost increases. If an engineering study has been performed or is proposed, use the projections of the study in conjunction with the budget for savings goals.)*

If major measures have already been implemented, establish goals of 2% per year for five years.

If the total of facilities is extensive and/or the equipment is complicated, the use of a consultant to evaluate the opportunities for energy saving might be required. The resultant report should include proposed measures, their costs and estimated savings. The final energy plan should determine the amount to be invested in savings projects each year and the total savings to be realized.)

Goal Achievement

Operations and Maintenance (*This needs to be stressed, required and audited.)*

In an institution that has not had a definitive conservation program, or has let its program lapse, the greatest savings would be found in operation of the conditioning and lighting systems. Reduction in run time, either through changes in the operating schedule of an existing energy management system (EMS), repair of the EMS or improved manual operation of equipment (especially lights) will produce the most immediate reduction.

Changeout of lighting from incandescent or standard 40 watt fluorescent tubes can be an immediate low budget move. ***Suggest T-8s with electronic ballasts, LED Exit lights, LEDs in MCCs, etc.***

Investigate the list (Appendix A) for measures.

Projects for Conservation

Appendix B contains a comprehensive list of projects. The institution should decide where the need is greatest and what the budget will allow. *(Often the lighting project, or relamping, could fall from the operations category into projects, depending on the scope. Installation of an EMS or enhancement of an existing system would produce immediate results, if done and used correctly. If old or maintenance-intensive HVAC equipment could be replaced with more efficient models, this is a good dual opportunity.)*

Major projects would include the replacement of major systems, roof insulation and repair, or the reduction of window area in older buildings. *(Identification of these opportunities, their estimated costs and projected paybacks may require outside consulting expertise.)*

New Construction

A college or university should provide input to design teams with emphasis on energy efficiency. Develop guidelines for lighting levels and for efficient HVAC systems. Insist on reasonable and compatible control systems with logical zoning, especially in additions and renovations. ***All too often our input for this is ignored or sacrificed for cosmetics.***

INVOLVEMENT

Administration

The most effective programs have support from the highest levels of administration. Once the policy is established that the end user is a) students, b) faculty or c) custodial (in descending order of savings) the Energy Manager should expect the backing of the highest levels of administration to enforce the operation of the energy consuming equipment.

Staff

The cooperation of the faculty and staff of each school can be invaluable to the information flow and efficiency of the program. If the energy program is perceived as friendly to the inhabitants and all reasonable efforts are made for their comfort, this cooperation can be achieved. *(On occasion, a payback of energy savings in the form of non-designated funds to a particular department can serve as a tangible reward.)*

Reporting

The Energy Manager will monthly enter the current usage of metered energy into the spreadsheet for comparison against previous years and with a running total for the current school year to date. Appropriate copies should be distributed as soon as possible to appropriate equipment operators and administrators (as end users) and all reports forwarded to the Director of Facilities and Chief Business Officer as designated.

As closely as possible to the end of the school year, a report will be distributed to all concerned.

Appendix A

Operating and Maintenance

Suggested Measures

Appendix B

Suggested Projects for Conservation

(SAMPLE)

ENERGY PLAN FOR STATE AGENCIES OF SOUTH CAROLINA

Developed by

South Carolina Energy Office
of South Carolina Budget and Control Board

Developed March 2006

Sample Energy Plan for State Agencies of South Carolina

CONTENTS

Purpose

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Policy

This institution shall attempt to eliminate the unnecessary use of purchased energy and to economize the remainder to the greatest extent possible.

With the concurrence of administration and staff, space conditioning times will be minimized without affecting business or regular activities.

Lighting will be minimized without detriment to productivity, safety or security.

Equipment improvements and replacement for better efficiency will be included in the budget and implemented as funding allows.

The primary person responsible for this program shall be the Energy Manager, reporting to the Director of Facilities.

Energy Manager

The administration will designate an Energy Manager, either as a primary or collateral duty. ***(May want to define duties/ background more to avoid the "Good old boy" system.)*** This person shall be responsible for implementing and continuing the energy plan. The performance evaluation of this person will include the progress of energy savings. The Energy Manager will bear the responsibility for providing the measures for reducing energy consumption, assisting in their implementation, following the monthly comparison of consumption and providing periodic reports of progress to administration and end users of energy. *(It is best if the energy manager is knowledgeable in the mechanical systems in the facilities. A good working relationship with physical plant operators, maintenance and custodial staffs is necessary.)*

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baseline of use and of cost. (*This can be done by using the last year's use or an average of the last three years, providing the building usage has not changed. The cost baseline is best used from the latest year or perhaps from the highest of the last three years.)*

Divide the annual cost of all energy sources by the gross square feet. This is a comparison benchmark within your own facility and across the state. *(In agencies with a long term energy program, habits, conservation measures, attention to detail and deliberate building strategies have contributed to low area cost. The wide range of facilities and activities in different state agencies also provide a difficulty in comparison.)*

List types of HVAC equipment and major systems in each school. Note types of lighting. *(This is a good time to update any equipment listings to include manufacturer, model number and age of major equipment for maintenance purposes. The wattages and models of lighting should be noted and a watt per square foot in classrooms, offices and corridors should be recorded.)*

Goals

Establish a five year plan for energy reduction in existing buildings. Assume measurable reduction at the end of the first year AFTER the initial implementation. *(If no appreciable energy measures have been made to date, derive a 15% cost reduction over the five year period. Assume 7% of that will be achieved in the first twelve month period after initial measures are taken. The next goals will be 2% per year for four years. Actual energy use will have to be reduced more than these percentages to counter fuel cost increases. If an engineering study has been performed or is proposed, use the projections of the study in conjunction with the budget for savings goals.)*

If major measures have already been implemented, establish goals of 2% per year for five years.

If the total of facilities is extensive and/or the equipment is complicated, the use of a consultant to evaluate the opportunities for energy saving might be required. The resultant report should include proposed measures, their costs and estimated savings. The final energy plan should determine the amount to be invested in savings projects each year and the total savings to be realized.)

Goal Achievement

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Change out of lighting from incandescent or standard 40 watt fluorescent tubes can be an immediate low budget move. ***Suggest T-8s with electronic ballasts, LED Exit lights, LEDs in MCCs, etc.***

Investigate the list (Appendix A) for measures.

Projects for Conservation

Appendix B contains a comprehensive list of projects. The institution should decide where the need is greatest and what the budget will allow. *(Often the lighting project, or relamping, could fall from the operations category into projects, depending on the scope. Installation of an EMS or enhancement of an existing system would produce immediate results, if done and used correctly. If old or maintenance-intensive HVAC equipment could be replaced with more efficient models, this is a good dual opportunity.)*

Major projects would include the replacement of major systems, roof insulation and repair, or the reduction of window area in older buildings. *(Identification of these opportunities, their estimated costs and projected paybacks may require outside consulting expertise.)*

New Construction

An agency should provide input to design teams with emphasis on energy efficiency. Develop guidelines for lighting levels and for efficient HVAC systems. Insist on reasonable and compatible control systems with logical zoning, especially in additions and renovations. ***All too often our input for this is ignored or sacrificed for cosmetics.***

Involvement

Administration

The most effective programs have support at the highest levels of administration. Once the policy is established that the end user is a) clients, b) staff or c) custodial (in descending order of savings) the Energy Manager should expect the backing of the highest levels of administration to enforce the operation of the energy consuming equipment.

Staff

The cooperation of the staff of each facility can be invaluable to the information flow and efficiency of the program. If the energy program is perceived as friendly to the inhabitants and all reasonable efforts are made for their comfort, this cooperation can be achieved. *(On occasion, a payback of energy savings in the form of non-designated funds to a particular department can serve as a tangible reward.)*

REPORTING

The Energy Manager will monthly enter the current usage of metered energy into the spreadsheet for comparison against previous years, with a running total for the current school year to date. Appropriate copies should be distributed as soon as possible to appropriate equipment operators and administrators (as end users) and all reports forwarded to the Director of Facilities and Chief Business Officer as designated.

As closely as possible to the end of the fiscal year, a report will be distributed to all concerned.

Appendix A

Operating and Maintenance

Suggested Measures

Appendix B

Suggested Projects for Conservation